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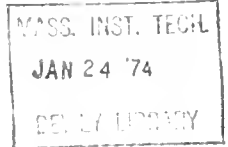
LEADERSHIP AND SUPERVISION IN THE INFORMAL ORGANIZATION

George F. Farris

June, 1973

No. 665-73





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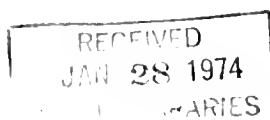
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LEADERSHIP AND SUPERVISION IN THE INFORMAL ORGANIZATION

George F. Farris

Most research reports are written in a hypothetico-deductive fashion. After years of careful thinking and perusal of the literature, the author develops a theoretical framework from which hypotheses are derived. He then develops operational definitions of his theoretical constructs and designs a study to test his hypotheses.

I say that reports are written in that fashion, but I suspect that often they are not actually produced in quite so orderly a manner. Such is the case with the report I am about to present to you.

The report itself begins with a point of view about leadership. It suggests that there is much to be learned by considering leadership as a process of influence. This framework appears to lead to concepts of four supervisory styles and statements of conditions under which each may be more appropriate. Empirical research on supervision in the informal organization of scientists and engineers is then presented which yields results consistent with part of the framework.

But things did not happen that way. The true sequence of events is nearly the reverse! For several years one thrust of my research has attempted to identify factors which characterize a stimulating working environment for a scientist or engineer. Among the factors examined were the practices of the technical supervisor. Moreover, the "informal organization" seemed to be a good way to conceptualize the interactions among technical people and their supervisors which were found to stimulate

technical performance. A framework was developed to describe the informal organization, leading to statements about "colleague role networks" in innovative groups and leaders in the informal organization. Further reflection resulted in a general framework which considers leadership in terms of influence. Finally, this point of view on leadership led me to suggest that our understanding of leadership could be advanced by treating three aspects of influence: its amount, its distribution, and qualitative characteristics of the influence process.

LEADERSHIP AS INFLUENCE

Most theories of leadership which define the term "leadership" equate it with some aspect of influence on task accomplishment or on other persons. For example, Hemphill and Coons (1957, p.7) tentatively defined leadership as "the behavior of an individual when he is directing the activities of a group toward a shared goal." Fiedler (1964, p.153) defined the leader as "the individual in the group who directs and coordinates task-relevant group activities, or who, in the absence of a designated leader, automatically performs these functions in the group." Katz and Kahn (1966, p.334) defined leadership as "any act of influence on a matter of organizational relevance." Recently Jacobs (1970, p.323) considered leadership to be "an interaction between persons in which one presents information of a sort and in such a manner that the other becomes convinced that his outcomes (benefits/costs ratio) will be improved if he behaves in the manner suggested or desired."

Such definitions of leadership in terms of influence imply that leadership theory and research should be concerned with at least three types of questions:

1. How much influence is exerted?
2. How is influence distributed among group members?
3. What characterizes the process of distributing influence among group members?

The first type of question asks whether leadership is present at all in a given situation. In terms of the above definitions, is any individual "directing the activities of a group toward a shared goal", "directing and coordinating task-relevant group activities," influencing a matter of organizational relevance," or interacting in such a manner that another individual "becomes convinced that his outcomes (benefits/costs ratio) will be improved...?"

The second type of question asks where leadership is present in a given situation. To what degree is each of the individuals potentially involved in a given situation actually directing activities, influencing matters of organizational relevance, or convincing others of improved outcomes? What characterizes those individuals exerting relatively great or relatively little leadership?

The first two questions deal with quantitative aspects of leadership, asking how much there is and how much given individuals exercise. The third question asks about qualities of the leadership process. In what ways do individuals direct activities, influence matters of organizational relevance, or convince others of improved outcomes?

The above types of questions are necessary to describe the leadership process. In addition, leadership theory and research may be concerned with the question of leadership effectiveness. The three types of questions then become transposed as follows: For greater effectiveness,

1. How much influence should be exerted?
2. How should influence be distributed among group members?
3. How should the process of distributing influence among group members be characterized?

It is my impression that past theory and research on leadership has concentrated on the third question, attempting to identify characteristics of the leadership process which relate to greater effectiveness. For example, the Ohio State studies identified "consideration" and "initiating structure" in leadership behavior; the early Michigan studies were concerned with "employee orientation" and "production orientation." A similar emphasis on the leadership process is apparent in Bowers and Seashore's (1966) four factors of support, interaction facilitation, goal emphasis, and work facilitation; in Katz and Kahn's (1966) discussion of origination, interpolation, and administration; in Jacobs' (1970) exchange theory; and in House's (1971) path-goal theory.

The second question -- that of the distribution of influence among group members -- has received considerably less systematic attention in leadership theory and research. Work on related problems has considered the matter, however. Tannenbaum's (1968) control graph conceptualizes the amount of

influence which people at different hierarchical levels of an organization are perceived to exert on organizational activities. Bales' (1950) and Benne and Sheats' (1948) early work considered task and group maintenance roles which can be performed by any member of a group to influence its decision-making activities. The investigations of "closeness of supervision" in the early Michigan work (Kahn and Katz, 1960) were concerned with one aspect of the distribution of influence. The one theory of leadership which explicitly discussed the distribution of influence among group members of Bowers and Seashore's (1966). In their theory and research, they carefully distinguish between "managerial leadership" and "peer leadership," and in their research they examine the relationship of each type of leadership to the other and to their criteria of performance and satisfaction.¹

The characteristics of influential group members and successful leaders have been studied for many years. The early work of those following a "trait" approach to leadership attempted to identify characteristics of those individuals who exert relatively great leadership.

¹Katz and Kahn (1966, pp.331-332) recognize the importance of the distribution of influence, stating, "Perhaps the most persistent and thoroughly demonstrated difference between successful and unsuccessful leadership at all three levels has to do with the distribution or sharing of the leadership function." Despite this assertion, however, Katz and Kahn's chapter on leadership does not cite the evidence which led to it, nor does their theory of leadership explicitly consider the way in which influence is distributed.

Fiedler's (1967) more recent and more sophisticated theory proposes a framework for understanding how a leader's personality attributes affect group performance.

The first question -- how much influence is exerted -- has not to my knowledge been addressed directly in leadership theory and research. Katz and Kahn's (1966) definition of leadership as "any act of influence on a matter of organizational relevance" opens the door for consideration of whether or not leadership occurs regarding a particular matter. Their classification of leadership acts in terms of their effect on organizational structure suggests three general areas in which influence may be exerted -- origination, interpolation, and use of structure --, but their open systems leadership theory only begins to consider systematically the consequences of leadership or lack of it in each area. In view of Katz and Kahn's (1966, p.334) assertion that "an organization properly designed for its purpose will not function adequately without acts of leadership," it would be important to address research and theory more systematically to the consequences of leadership on organizational functioning.

To sum up, many leadership theories consider leadership to involve influence, implying that three aspects of influence should be considered: its amount, its distribution, and qualitative characteristics of the influence process. Despite the importance of the first two questions most work on leadership has concentrated on the third, dealing with qualities of the leadership process and characteristics of the formal leader. Some attention in research has been paid to the distribution of influence among group members, but leadership theory could treat these phenomena more

systematically. Although open systems theories imply that it is important to know whether or not leadership is exerted on particular matters of organizational relevance, leadership theory and research have yet to do justice to this question.

A LEADERSHIP FRAMEWORK

Four Supervisory Styles

If leadership involves influence on matters of organizational relevance, it can be exerted by any person, inside or outside of a formal organization. The person exerting leadership may or may not be in a managerial position. I shall use the term supervision to refer to the behavior of persons assigned to managerial positions in a formal organization. My use of "supervision" is essentially the same as Jacob's (1970) term "superordinate behavior."

Let us consider a supervisor and a single group member or subordinate who reports to him in an organization. (A similar analysis can be applied to leadership involving other subsets of people in an organization.) In working on a matter of organizational relevance, the supervisor may exercise relatively high or low influence himself, and through his behavior he may allow his subordinate to have relatively great or relatively little influence. (See Figure 1.) Thus, four "pure" styles of supervision are possible.

Insert Figure 1 About Here

When both the supervisor and group member have substantial influence on the matter, the supervisory style may be said to be one of collaboration. Leadership regarding this particular matter of organizational relevance is shared by the supervisor and group member.

When the supervisor has substantial influence and the group member does not, the supervisory style may be said to be one of domination. Leadership regarding this matter is exercised chiefly by the supervisor.

When the supervisor does not have substantial influence on a matter of organizational relevance but the group member does, the supervisory style may be termed delegation. Leadership regarding this matter is exercised chiefly by the group member.

Finally, when neither the supervisor nor the group member has substantial influence on a matter of organizational relevance, the supervisory style may be called one of abdication. Very little leadership occurs at all regarding this matter, unless influence is exercised by someone other than the supervisor and the group member being considered.

The questions about the existence and distribution of leadership are readily answerable in terms of this framework. With supervisory styles of collaboration, domination, and delegation, influence is exerted and leadership occurs regarding the matter of organizational relevance. With a supervisory style of abdication, essentially no leadership takes place. With a style of collaboration, influence may be distributed equally between supervisor and subordinate, or one may have

greater influence than the other. The important point is that both exercise substantial influence. With a style of domination, the supervisor has greater influence and with delegation, the group member is more influential. In each instance, essentially only one person exerts substantial influence.

The framework assumes that the amount of influence regarding a particular matter is not fixed. The supervisor need not gain influence at the expense of the group member. Rather, he may increase his influence without the influence of the group member being affected, and he may do this regardless of the supervisory style currently being used. In Figure 1, for example, a supervisor may increase his influence from a to a' , while the group member's influence may remain at b . The total leadership on this matter of organizational relevance would thus increase. The supervisory style would still be one of collaboration at both points (a,b) and (a',b) in Figure 1. In each case the supervisor and the group member both exert substantial leadership on the matter of organizational relevance.

In a similar manner, the supervisory style would remain collaborative if the group member's influence increased from b to b' in Figure 1. If both the supervisor and the group member increased their influence on the matter of organizational relevance, the total amount of leadership on the matter would increase even more. In Figure 1, more leadership is exercised at point (a',b') than at either point (a',b) or (a,b') .

"Close" and "General" Supervision Reconsidered

One thrust of the early Michigan work on supervision (Kahn and Katz, 1960) contrasted close supervision with general supervision. In terms of the framework advanced here, this research contrasted high and low supervisory influence on the achievement of work goals. In the case of high supervisory influence resulting from close supervision, the supervisory style was probably one of domination. If subordinate influence was also substantial it could have been collaboration. In the case of low supervisory influence resulting from general supervision, the supervisory style could have been either abdication or delegation, depending on the amount of influence exercised by group members.

A related thrust examined relationships between group member participation and performance. In terms of the present framework, this research contrasted high and low group member influence on the achievement of work goals. In the case of high group member participation, the supervisory style could have been one of delegation or collaboration, depending on the supervisor's own influence. In the case of low group member participation, the supervisory style could have been domination or abdication, also depending on the supervisor's own influence.

Thus in both the studies of closeness of supervision and group member participation, it is not completely clear which supervisory styles were actually being compared. The results obtained in both cases could have been due to the supervisor's degree of influence, the group member's degree of influence, or some combination of the two. The framework advanced here may help to determine whether "general supervision" is actually delegation or abdication in a particular situation and whether

participation implies delegation or collaboration. Moreover, the framework permits separation of these issues of the distribution of influence from the prior question of whether influence is exercised at all. Perhaps the most important factor for task accomplishment is simply that influence be exercised by someone, not who exercises it.

Some Tentative Hypotheses

Two types of hypotheses may be advanced concerning the amount and distribution of leadership: "one-best-way" hypotheses and contingency hypotheses. The former are concerned with the question of which supervisory style is most effective on the average, while the latter are concerned with defining conditions under which each style is apt to be more effective.

"One-Best Way" Hypotheses

At least three hypotheses regarding leadership effectiveness may be advanced. Two are concerned with the amount of leadership, while the third is concerned with its distribution.

The total influence hypothesis suggests that greater influence is associated with greater effectiveness. For all matters of organizational relevance, collaboration is probably the best supervisory style, since with collaboration, total influence is apt to be greatest. Support for this total influence hypothesis comes from consistent findings of positive relationships between total amount of influence and effectiveness of organizational units (Tannenbaum, 1968). Bowers and Seashore's (1966) complex set of findings regarding the relationships between managerial leadership, peer leadership, satisfaction, and effectiveness could perhaps also be considered to be supportive of a total influence hypothesis.

The substantial influence hypothesis suggests that only a substantial amount of influence need be exercised by some party for effective handling of a matter of organizational relevance. As with satisficing in decision making, only a minimal amount of influence has to be exerted for a matter to be dealt with adequately. Additional influence, over and above the minimally substantial amount, not only adds nothing to the execution of the matter of organizational relevance; it also is deleterious to the organization in that it drains away scarce resources which could be better applied elsewhere. Thus domination or delegation will always be superior supervisory styles. I am not aware of any research which supports this hypothesis, and the research cited above regarding total influence could be interpreted as contrary to a substantial influence hypothesis.

The egalitarian hypothesis suggests that performance and satisfaction are higher when leadership is distributed equally among all the relevant parties -- for nearly all matters of organizational relevance. Only in cases of very routine tasks or very high time constraints is a more authoritarian distribution of leadership more appropriate. Thus, the best supervisory style is collaboration with all parties having substantial and equal influence. The egalitarian hypothesis underlies such principles of democracy as "one man, one vote" and "majority rule." It is supported to a degree, especially regarding satisfaction, by some studies of small group problem solving (Hoffman, 1965; Collins and Guetzkow, 1964). In Tannenbaum's (1968) studies of distribution of influence in organizations, the egalitarian hypothesis receives considerably less support.

A Contingency Hypothesis

Under certain conditions it may be more appropriate for an individual to exert leadership. One of these is his competence to deal with the matter at hand. Farris and Butterfield (1972) suggested that the most parsimonious explanation of relationships between control and effectiveness of Brazilian development finance institutions was that in the more effective institutions, competence and control went hand-in-hand. Those individuals who were more competent had more influence in decision-making. A second condition is the importance of acceptance of the outcome of the leadership. A consistent finding in studies of decision making in small groups (e.g., Collins and Guetzkow, 1964; Hoffman, 1965) is that individuals are more apt to accept and implement decisions which they have greater influence in making. A third condition is the presence of time pressure. For many tasks an individual acting alone can make a satisfactory decision faster than a group. Experimental studies of communications networks (Collins and Guetzkow, 1964; Glanzer and Glaser, 1959) have shown that more centralized networks, in which a single individual has much greater influence than the rest of the group, are faster than less centralized networks working on the same task.

Thus, the appropriateness of a supervisory style may be hypothesized to be contingent upon five factors: the supervisor's competence regarding the matter, the group member's competence regarding the matter, the importance of acceptance by the supervisor of the results of leadership on the matter, the importance of acceptance by the supervisor of the results of the group member's leadership on the matter, and the importance of acceptance by the group member of the results of

leadership on the matter, and the presence of time pressure. Figure 2

Insert Figure 2 About Here

summarizes some of the ways in which these factors interact to determine which style is more appropriate. The first factors to be considered have to do with the competence of the supervisor and group member to deal with the matter of organizational relevance. If both are competent to exert leadership regarding it, then collaboration, domination, or delegation could be an appropriate supervisory style to employ. If the supervisor is competent but the group member is not, then domination is most appropriate. If the group member is competent but the supervisor is not, then delegation is most appropriate. If neither is competent, then abdication is the appropriate style, and the matter should be dealt with elsewhere in the organization.

If both the supervisor and the group member are competent to exert leadership regarding the matter, the importance of acceptance of the results of this leadership becomes a key determinant of the appropriate supervisory style to employ. If it is important that both the supervisor and the group member accept the results of the leadership, then collaboration is the appropriate style. If acceptance by the supervisor but not the group member is important, then collaboration or domination is appropriate. If acceptance by the group member but not the supervisor is important, then collaboration or delegation is appropriate. If acceptance by neither is important, then collaboration, domination, or delegation may be appropriate. If time pressure is high so that the matter must be dealt with quickly, then domination or delegation are preferred alternatives, since the time necessary for both parties to influence the

matter may be prohibitive.

In summary, leadership as commonly defined involves acts of influence on matters of organizational relevance. A framework was advanced which considers four supervisory styles -- collaboration, domination, delegation and abdication -- which describe the amount and distribution of influence. Tentative hypotheses were advanced regarding the best supervisory style for leadership effectiveness and conditions under which each style may be more appropriate. A total influence hypothesis and an egalitarian hypothesis suggested a collaborative supervisory style is best on the average; a substantial influence hypothesis suggested that domination and delegation are superior to collaboration. A five-factor contingency hypothesis proposed that the appropriate supervisory style depends on supervisory and group member competence, the importance of acceptance of the results of leadership by the supervisor and group member, and the degree of time pressure present.

Now let us turn to studies of leadership and supervision in the informal organization of a research laboratory. Following a description of these studies, the findings will be related to the hypotheses just advanced.

EXPLORATORY RESEARCH ON LEADERSHIP

For the past several years I have been involved in a program of research on organizational factors which motivate performance of scientists and engineers. In all over 2,000 technical personnel from

14 university, industrial, and government organizations have participated in the research investigations. From the factors identified in the earlier work (Pelz and Andrews, 1966) it seemed likely that the technical supervisor could have important effects on the performance of the people reporting to him. Much of our recent work has focussed on the role of the technical supervisor. Let me summarize highlights of three of these studies (Andrews and Farris, 1967; Farris, 1971; Farris, 1972).

Study 1: Supervisory Practices and Innovation

We began our investigation of technical supervision by pragmatically employing the concepts and research methods which were predominant in leadership theory and research that time. Non-supervisors were asked to describe their supervisors on 36 items asking about a variety of supervisory practices suggested by previous research and theory. Interrelationships among these items were determined, and ten measures of supervisory practices were derived with the help of a Guttman-Lingoes Smallest Space Analysis (Guttman, 1967; Lingoes, 1965). Three of these measures were concerned with task functions, three with human relations functions, two with administrative functions, and two with leadership styles of consultation and provision of freedom.

The study was conducted in a division of a NASA Research Center involved in research, development, and technical services. The work of the laboratory ranged from basic research on physical and chemical processes to atmospheric and deep space experiments employing rockets and satellites. Twenty-one groups participated in the study, containing a median of five members excluding the supervisor. Performance was measured

by asking supervisors and senior-level non-supervisors to rank-order the professionals with whose work they were familiar on innovation -- the extent the person's work had "increased knowledge in his field through lines of research or development which were useful and new." An average of 4.4 judges assessed the work of each individual. Since inter-judge agreement was reasonably good, their evaluations were combined into a single percentile score for each person. Group averages on innovation and each measure of supervisory practices were calculated after it was determined that differences between groups exceeded differences within groups on these measures. (For details, see Andrews and Farris, 1967.)

Supervisory practices as seen by subordinates were then related to group innovation as judged by senior scientists. In general, we found a positive relationship between innovation and task functions, a curvilinear relationship between innovation and human relations functions with highest innovation tending to occur under supervisors moderate in human relations functions, and a negative relationship between innovation and the supervisor's administrative functions. The two measures of leadership style -- provision of freedom and use of consultation -- were only moderately associated with innovation. For both measures innovation was higher when supervisors scored either high or low than if they scored in the middle.

In addition to examining these simple relationships between supervisory practices and innovation, we investigated relationships involving combinations of supervisory practices, with some interesting results. First, with regard to freedom, we found something very consistent with the

notion that influence and competence should go hand-in-hand. For supervisors low in task, human relations, and administrative functions, provision of freedom showed substantial positive relationships with innovation. For supervisors rated high in these competences, provision of freedom mattered less, and sometimes related negatively. These differences were quite pronounced; for example, for supervisors high in technical skills, provision of freedom correlated .0 with innovation; for supervisors low in technical skills, provision of freedom correlated .6 with innovation.

Consistent with this pattern, technical competence of the supervisor served as an important moderator of relationships between innovation and critical evaluation. For supervisors high in technical skills, the correlation between critical evaluation and innovation was +.5; for supervisors low in technical skills, it was -.5.

Moreover, in contrast to the notion proposed by Kahn (1956), Oaklander and Fleishman (1964), Blake and Mouton (1964) and others, we found no evidence that innovation was higher when supervisors were high in both task and human relations functions. Human relations skills had little moderating effect on the generally positive relationships between task functions and innovation, and vice versa.

Finally, consistent with the total influence hypothesis, we found that provision of freedom for subordinates was positively related to innovation when the supervisor preceded his own decision making with consultation with subordinates (correlation of +.7). Among supervisors making little use of consultation, however, provision of freedom was uncorrelated with

innovation (correlation of $-.1$), suggesting lower total influence.

Two sets of findings in this study surprised us. First, human relations functions were unrelated to innovation, unlike relationships found between human relations skills and other criteria in previous investigations. Our failure to find a relationship may have been due to the nature of the tasks of the technical personnel (as suggested by Fiedler, 1964 and Hunt, 1967), differences in people studies (scientists vs. rank-and-file workers), or the use of different criterion -- innovation. Second, administrative functions were related to innovation negatively, suggesting that administration may interfere with innovation or that innovation may interfere with administration. Perhaps the results occurred because we were studying lower levels of supervision where skill mix theory (Mann, 1965) says administrative skills are less important.

On a positive side, this study demonstrates that characteristics of technical supervisors are indeed related to subordinate innovation. Two characteristics seem to be especially important: the supervisor's technical competence and the conditions under which freedom is provided to subordinates. Both of these factors were followed up in subsequent research.

A Colleague Role Model of Leadership in the Informal Organization

The findings of the study of supervisory practices and innovation suggested that it would be important to understand more fully the process through which technical supervisors utilize their technical skills to influence the problem solving of their subordinates. At the same time, other findings showing that higher performing technical personnel were in

greater contact with their colleagues (Pelz and Andrews, 1966; Farris, 1969) suggested that it would also be important to understand the process through which scientists interact with another in their technical problem solving. A search of the literature on group problem solving (especially Maier, 1967 and Hoffman, 1961) and technical communications (especially Allen and Cohen, 1969 and Pelz and Andrews, 1966) led to the development of a rough model of the technical problem solving process.

The model considers three general stages: a suggestion stage in which a person comes up with an idea, a proposal stage in which the idea is developed into a concrete scheme for action; and a solution stage, in which a decision is reached for the organization to proceed in a particular way. Throughout this process colleagues can help one another by playing colleague roles -- performing activities which facilitate the problem solving of another professional. Seven colleague roles are considered, each of which is theoretically more apt to occur at one of the three stages. Providing original ideas, technical information, and organizational information are colleague roles which may help a scientist to form a suggestion. Help in thinking through a problem and critical evaluation may help the scientist to shape the suggestion into a proposal. And assuring a fair hearing and providing administrative help are colleague roles which may help to turn the proposal into a solution which is implemented in the organization. With the possible exception of the role of providing administrative help, these colleague roles are rarely specified in technical people's formal job descriptions. Hence a mapping of the colleague role

relationships among members of an organization may be considered to be a description of the "informal organization."

This colleague role model of the informal organization is also a process model of leadership as influence. Any person who plays a colleague role may be considered to be exerting substantial leadership. The question of the amount of leadership, raised in the beginning of this paper, may be answered by counting the number of colleagues who are useful to one another. The question of the distribution of leadership may be answered by contrasting the colleague role playing of the supervisor with that of group members. The colleague roles themselves provide a cognitive model of characteristics of the process of distributing influence.

In addition to suggesting conceptual ways to answer the questions of the amount, distribution, and process of leadership, the colleague role model implies that sociometric research methods can be used to investigate leadership and supervision. Members of an organization can be asked to name individuals who have been useful to them for the seven colleague roles. Substantial leadership can be operationally defined as occurring when an individual is named by a colleague as helpful for a colleague role. Similarly, the total amount of leadership can be measured by counting the number of times individuals are named by their colleagues for playing the various colleague roles. From this information it is possible to do several things. For example, "role networks" can be mapped showing who influences whom by doing such things as providing original ideas. Peer leadership (Bowers and Seashore, 1966) can be examined by noting the roles through which peers influence one another. Supervision can be investigated by noting the extent

to which supervisors are named for playing each colleague role. Informal leaders for each role can be identified by noting members of the organization who are often named by their colleagues for playing each role.

The second and third studies of technical supervision illustrate the application of the colleague role model of the informal organization to the study of leadership as influence. The first of these investigated the influence of one another and identified characteristics of those colleagues principal roles through which colleagues who were most influential (Farris, 1971; Swain, 1971). The second contrasted leadership in relatively more and less innovative groups (Farris, 1972).

Study 2: Characteristics of Leadership and Leaders

This study was carried out five years later in the same NASA organization as Study 1. About 70% of the participants were the same. One hundred seventeen professionals including twenty supervisors participated, a 98% response rate. They were asked to name individuals who had been helpful to them for each of the seven colleague roles. As many individuals as they wished could be named for each role, and the same individual could be named for more than one role. In addition, performance was measured in a manner similar to that of Study 1, and participants described several characteristics of their working environments on paper-and-pencil questionnaires.

Sociograms were plotted for each of the colleague roles in order to determine leadership networks for each characteristic of the influence process. Two of these sociograms are shown in Figures 3 and 4. Figure 3 shows who named whom as useful for help in thinking about a problem. Over half of the choices were directed to peers rather than supervisors.

Twenty-eight reciprocal choices were made. Thirty-five choices were made outside the division but within the research center, and an additional thirty choices were made outside the research center.

Insert Figures 3 and 4 About Here

In contrast, Figure 4 shows who named whom as helpful for providing administrative help and resources. Supervisors within the division received 76% of the choices for this role. Only three reciprocal choices were made. Very few choices occurred outside the division except for some by members of one branch heavily involved in providing support to other divisions within the center.

Supervisors were named often as helpful for all colleague roles. As Table 1 indicates, however, there were differences between roles in

Insert Table 1 About Here

the extent to which supervisors were named as helpful to their colleagues. They received the greatest percentage of mentions for roles of a more administrative nature, reaching a high of 76% for the role of providing administrative help. They were mentioned relatively less often for more technical roles, reaching a low of 42% for the role of being helpful for original ideas.

Intercorrelations were determined among the colleague roles based on a lognormal transformation of the number of times individuals were

mentioned for each role. Shared variances ranged from a high of 75% for "help in thinking" and "critical evaluation" to a low of 16% for "original ideas" and "learning about developments in the organization." Factor analyses were performed on the data from the total sample using the principal components solution with varimax (orthogonal) rotation. Four factors were rotated and identified as "technical," "administrative," "information," and "ideas." When three factors were rotated, the "ideas" role loaded highly on the "technical" factor; when two factors were rotated, the "information" role also loaded highly on the "technical" factor. Quite similar results occurred when factor analyses were performed separately for non-supervisors and supervisors.

These findings using sociometric data do not diverge greatly from findings based on Likert-type scales. Both measurement techniques have yielded technical and administrative factors to characterize aspects of the leadership process. The differences between supervisors and non-supervisors in colleague role playing are readily explainable in terms of the formal role requirements of the supervisor to perform administrative functions and the NASA organization's emphasis on technical competence as a basis for promotion to supervisor. The analysis of the "help-in-thinking" and "administrative-help" sociograms regarding reciprocal choices, choices of supervisors, and choices of people outside the division is consistent with these interpretations.

The "leaders" in the informal organization of the NASA organization--those persons named most often by their colleagues as helpful for each colleague role -- were contrasted with the remainder of the scientists in

the division. The top 15% for each factor were defined arbitrarily as informal leaders. Comparisons were made separately for the total sample and for non-supervisors alone, for the most part with similar results. To a great extent, findings were also similar for the seven colleague roles.

In contrast to the remainder of the scientists in the division, the leaders in the informal organization differed in certain skills, motives, rewards, and characteristics of the working environment. Leaders had been and continued to be higher performers on criteria of innovation, productivity, and especially usefulness in the organization. They saw others as having greater confidence in their abilities and they scored slightly higher on the Remote Associates Test of creative ability. The leaders in the informal organization felt more involved in their work. They tended to place greater emphasis on working with competent colleagues and less on working with congenial colleagues. They derived greater satisfaction from helping personnel to grow and develop. The leaders in the informal organization, especially the supervisors, were paid more and saw greater opportunities for advancement. The leaders talked to more people, receiving help as well as giving it. They felt more free to carry out their own ideas and more influential on their work goals. They also experienced greater time pressure.

To sum up, the leaders in the informal organization were more technically competent, more motivated by the technical aspects of their work, better rewarded, in more active contact with their colleagues, and more influential regarding their own work. Some of these characteristics are individual traits, not unlike those studies in the earlier "trait" approach to

leadership; other characteristics of these informal leaders, however, are to a great extent a function of the particular environments in which they work.

Study 3: Leadership In Innovative Groups

Are there differences in the informal organizations of more and less innovative groups? If so, to what extent do these differences occur in roles played by supervisors, group members, and people outside the groups? When innovation is the criterion of performance, which roles should characterize "managerial leadership" and "peer leadership" (Bowers and Seashore, 1966)?

An exploratory study of fourteen groups in the NASA laboratory investigated these questions. Groups averaged 6.2 members, excluding the supervisor. Innovation of individual group members was evaluated in the same manner as in the previous studies by an average of 7.6 judges, and group innovation scores were determined by averaging the scores of the individual members. The seven most innovative groups were compared with the seven least innovative groups in the colleague roles played by supervisors, group members, and outsiders for one another. Despite the small number of groups, some consistent patterns of leadership in the informal organization emerged. See Figure 5.

Insert Figure 5 About Here

In the more innovative groups the members appeared to collaborate more with one another in their technical problem solving. They named fellow

group members more often as useful to them for providing technical information and help in thinking about technical problems. In the less innovative groups, on the other hand, members named one another less often as helpful, except for one colleague role: providing information about developments elsewhere in the organization.

Consistent with these differences in the peer leadership in more and less innovative groups, the more innovative groups received relatively little help from professionals outside their groups. On the other hand, members of the less innovative groups found outsiders especially useful for help in thinking about technical problems and administrative help. Apparently the more innovative groups were more cohesive.

Moreover, there were differences in managerial leadership between the more and less innovative groups. In the more innovative groups the supervisors exercised more leadership -- but by playing particular colleague roles. They were especially useful to group members for critical evaluation, administrative help, and help in thinking about technical problems. In addition, group members were more helpful to these supervisors for providing technical information, help in thinking about technical problems, critical evaluation, and original ideas.

In the less innovative groups the supervisors were much less active in the informal organization. They were named more often by their groups than supervisors of more innovative groups for only two roles: original ideas and organizational information. Perhaps members of the less innovative groups were often working on their supervisors' ideas rather than their own.

There were no roles at all for which members of the less innovative groups were more helpful to their supervisors than were their counterparts in more innovative groups to their supervisors.

As in the case of the group members, the supervisors of the less innovative groups collaborated more actively with outsiders than did the supervisors of the more innovative groups. Supervisors of less innovative groups were more helpful to outsiders for original ideas and help in thinking, while outsiders were more useful to them for providing help in thinking and organizational information. Supervisors of more innovative groups named more outsiders as helpful for only one role -- providing original ideas, and outsiders named them more often only for administrative help.

In short, the more innovative groups appeared to operate more as teams, having greater peer and managerial leadership. The less innovative groups appeared to operate less as teams, having less peer and managerial leadership, and collaborating more with professionals outside their groups. The supervisors of the less innovative groups were apt to exercise leadership by providing original ideas to group members and outsiders. These supervisors scored higher on the Remote Associates Test of creative ability than did the supervisors of the more innovative groups, but the performance of the two sets of supervisors was rated equally high in usefulness to the organization. Supervisors of more innovative groups were apt to exercise leadership by playing colleague roles, such as providing critical evaluation, which theoretically should help group members shape their own

suggestions into proposals and solutions.

THE FRAMEWORK AND THE RESEARCH

As stated in the introduction to this paper, the leadership-as-influence framework was developed after the three research studies on leadership and supervision in the informal organization had been completed. Because these studies heavily influenced the development of the framework, several of the research findings are relevant to it. Let us turn to them now, bearing in mind that the framework was developed in part to help interpret such findings after the fact, not to predict them. A logical next step would involve research designed specifically to test hypotheses developed within the leadership-as-influence framework.

One-Best-Way Hypotheses

Three tentative "one-best-way" hypotheses were suggested regarding the amount and distribution of influence: the total influence hypothesis, the substantial influence hypothesis, and the egalitarian hypothesis. For different reasons the total influence hypothesis and the egalitarian hypothesis suggested that a collaborative supervisory style is best on the average. The substantial influence hypothesis suggested either domination or delegation.

The findings in the three studies seem to be most consistent with the notion that innovation is related to a collaborative supervisory style in which both the supervisor and the group members have substantial influence. In both studies of group innovation, the supervisors apparently exercised substantial leadership. Their skills were related to group

innovation, and they were very active in the informal organizations of the more innovative groups, especially in playing colleague roles which involve reacting to subordinates' ideas. Group member influence also appeared to be associated with innovation. Members of the more innovative groups were frequently named as being useful for original ideas and several other technical roles.

Other findings could be interpreted to mean that domination is not associated with innovation. If being useful for original ideas can indicate domination, then the supervisors of the less innovative groups may have been dominating their technical activity. The first study indicated that a less skilled supervisor's failure to provide freedom -- and perhaps to dominate through this failure-- was associated with lower innovation.

If collaboration is the best supervisory style on the average, then, is this because more total influence is exercised or because leadership is distributed relatively equally? The data in the three studies do not lend themselves to a direct answer to this question, since no attempt was made to quantitatively assess the overall influence exercised by each party. Some of the findings of the studies suggest that qualitative characteristics of the distribution of influence may also have been important.

The overall pattern of results was quite consistent with Maier's (1957) theory of group problem solving. He suggested that a group is most apt to be successful when its leader performs an integrative function analagous to that of the nerve ring of the starfish. He does not dominate the discussion and produce the solution, but instead serves as an integrator by receiving information, facilitating communication among group members,

relaying messages, and integrating ideas so that a single unified solution can occur. Moreover, "the idea-getting process should be separated from the idea-evaluation process because the latter inhibits the former" (Maier, 1963, p.247).

In the more innovative groups the supervisors tended to behave very much as Maier says they should. They were named more often by their groups as useful for facilitating thinking and providing critical evaluation, two roles which can be considered integrative functions. Moreover, they received original ideas from more sources outside the group, probably relaying them to group members as appropriate. Equally important, the supervisors of the more innovative groups were seen as less useful for their own original ideas. Thus, they were probably less apt to impose their own ideas on their groups, an activity which Maier argues strongly will inhibit group innovation. Probably this situation also represented a considerable degree of separation of evaluation from the production of ideas. The supervisors of the more innovative groups were more useful for critical evaluation, but the ideas they evaluated tended to come more often from other sources -- outsiders or group members.

Intriguing as these speculations are, they must be regarded as tentative due to the small number of groups in the studies. Moreover, the finding that a collaborative supervisory style seemed to work best on the average may have been due to a fortunate mix of supervisor and group member competence, the importance of acceptance to each, and time pressure. Let us now turn to the evidence for these contingency questions now.

Contingency Hypothesis

The appropriateness of a supervisory style was said to depend on five factors: the supervisor's competence, the group member's competence, the importance of acceptance to the supervisor, the importance of acceptance to the group member, and the degree of time pressure present. Some of the findings in the three studies are relevant to these factors. Let us examine each in turn.

In the study of supervisory practices, direct support was found for the importance of the supervisor's competence as a moderating factor in relationships between supervisory practices and subordinate innovation. For supervisors low in skills, providing freedom was positively related to subordinate innovation; for highly skilled supervisors, providing freedom was unrelated to subordinate innovation. Moreover, for supervisors high in technical skills, critical evaluation was positively related to innovation; for supervisors low in technical skills, critical evaluation was found to be related negatively to subordinate innovation. These findings are clearly consistent with the notion that competence and leadership should go hand-in-hand.

No direct test was made of the moderating effect of group member competence on relationships between supervisory styles and innovation. However, more competent group members were named as leaders in the informal organization, and more informal leadership occurred in more innovative groups. Apparently "performance feedback loops" (Farris, 1969; Farris & Lim, 1969) -- the causal influence of performance on the working environment -- also affected the degree to which a group member exercised leadership in the

informal organization. Perhaps group member competence, as evidenced in their innovation, also had a causal influence on supervisory behavior.

No data were available on the importance of acceptance to either supervisors or group members. Consistent with the idea of the moderating effect of the importance of acceptance, however, is the finding that in less innovative groups, group members were working more often on their supervisor's original ideas, which they may have been less apt to accept.

No test was made of the moderating influence of time pressure on supervisory style.

In summary, the three research studies provide some evidence consistent with the contingency hypothesis although they were not designed to test it. Evidence from these studies is most consistent with the hypothesized moderating effect of the supervisor's competence.

SUMMARY AND CONCLUSION

Returning to a statement implicit in many definitions of leadership -- that leadership involves influence -- it was suggested that leadership theory and research should be concerned with questions of the amount and distribution of leadership as well as with qualitative characteristics of the leadership process. A framework for doing this was proposed. It suggests four supervisory styles depending on the amount and distribution of influence between a supervisor and group member -- collaboration, domination, delegation, and abdication. Tentative hypotheses were stated concerning the supervisory style which is best on the average and conditions under which a particular supervisory style would be more appropriate. One-best-way hypotheses emphasized total influence, substantial influence, and an

egalitarian distribution of influence as determinants of leadership effectiveness. The moderating factors suggested in the contingency approach were the competence of the supervisor and group member, the importance that each accept the results of leadership, and the degree of time pressure. In addition, a framework of leadership in the informal organization was advanced, describing qualitative characteristics of the leadership process in terms of roles which theoretically facilitate problem solving. This description allows investigation of the amount and distribution of influence as well as specific qualities of the leadership process.

Three research studies were described dealing with supervisory practices and innovation, characteristics of leadership and leaders, and leadership in innovative groups. These studies were related to the above framework, but not designed to test it. Overall results were consistent with the notion that collaborative leadership is best on the average, but that the appropriateness of a supervisory style depends on the competence of the supervisor, and perhaps other contingency factors as well.

This paper should be considered as a position paper; what is needed now is a precise statement of hypotheses within the broad framework, operational definitions of constructs, and research designed specifically to test these hypotheses. In short, the next step should involve the kinds of things which happen when research is conducted in the way that it is reported!

In closing, I would like to comment on a question which may well be puzzling the reader at this point: Why return to the primitive notion of leadership as influence? Why not focus on qualities of the process of leadership in line with earlier approaches -- for example, those of Ohio State, old or new Michigan, Illinois - Washington, path-goal, or exchange theory? My answer is that these lines of investigation leave me somehow feeling uneasy and incompletely satisfied, despite my great admiration for their accomplishments. Part of this uneasiness stems from my earlier research findings (Farris, 1969; Farris and Lim, 1969) suggesting that performance, which most theories assume results from leadership, in fact is an important cause of leadership. When a group member performs well, a supervisor is apt to become more considerate and to supervise less closely. Thus, I have emphasized competence as a moderating factor.

Cartwright's (1973) recent provocative observations on the case of research on the risky shift may have a message for leadership research and theory as well. An MIT master's thesis (Stoner, 1961) found that, contrary to "common sense," groups made more risky decisions than individuals. Nearly 200 studies followed, resulting in the current conclusion that groups are not invariably riskier than individuals. To a great extent it depends on the particular decision being made.

Cartwright (1973, p.230) suggested that the case was analagous to Kuhn's (1962) term paradigm -- "the complex set of beliefs and assumptions that investigators implicitly adopted in their research on this topic." Cartwright's analysis suggested that despite its clear advantages, the risky-shift paradigm "engendered certain self-protective processes that unnecessarily delayed progress in this line of investigation. These had

to do with labeling, motivation, methodology, and the media of communication." (Cartwright, 1973, p.230)

In a sense some of the current approaches to leadership provide paradigms, with their inherent advantages and disadvantages. As such, they may have both facilitated and inhibited progress. Some of the contingency approaches in today's symposium represent dominant paradigms, while others, like the present paper, represent departures. The very existence of contingency approaches to leadership, which characterize all papers in this symposium, represents departures from one-best-way paradigms. In concluding, let me ask you -- what paradigms are implicit in the lines of investigation represented in today's symposium? Would progress in our understanding of leadership best be advanced by following one or another of them, by departures, or by proceeding on both fronts simultaneously?

Table 1

Number of Times Mentioned for Colleague Roles

<u>Role</u>	<u>Average number per supervisor</u>	<u>Average number per nonsupervisor</u>	<u>Per cent to supervisors</u>
Technical information	5.2	1.5	42
Help in thinking	5.4	1.2	48
Critical Evaluation	5.4	0.9	55
Original ideas	3.1	0.9	42
Fair hearing	4.1	0.3	72
Administrative help	5.7	0.4	76
Division developments	6.8	1.0	59

From Farris(1973,p.28)

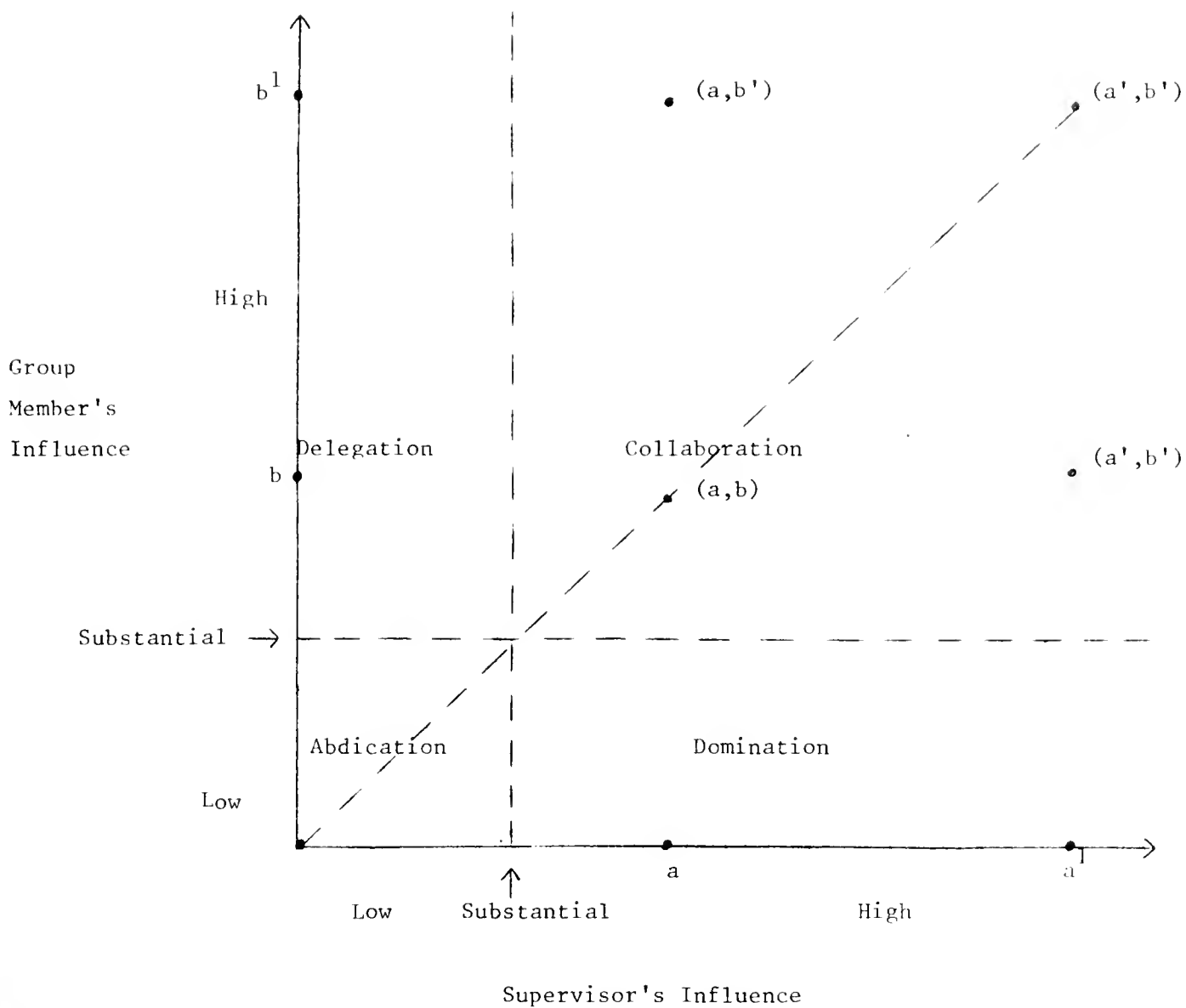


Figure 1. Supervisory Styles and Influence on a Matter of Organizational Relevance

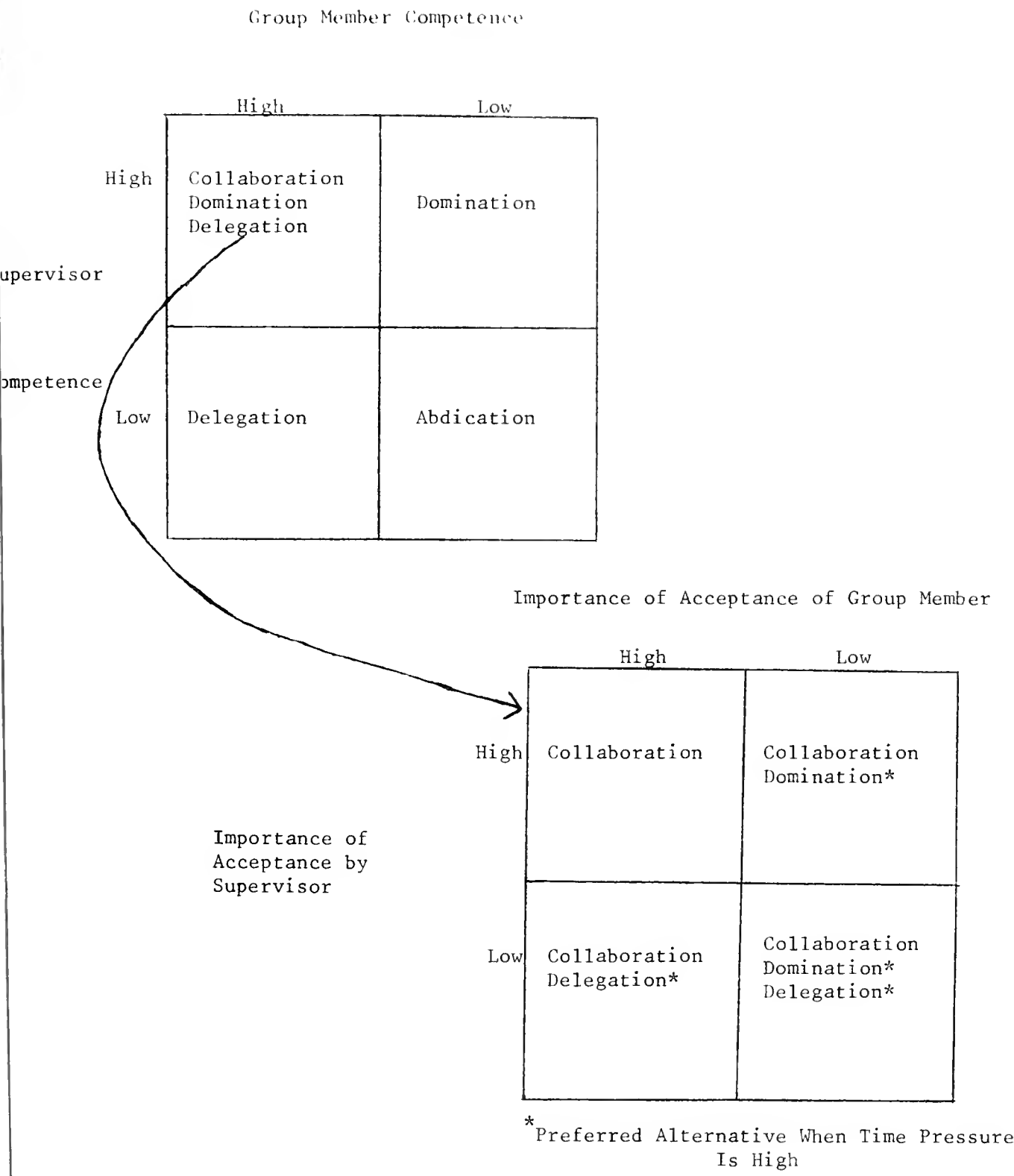


Figure 2. Five-Factor Contingency Hypothesis

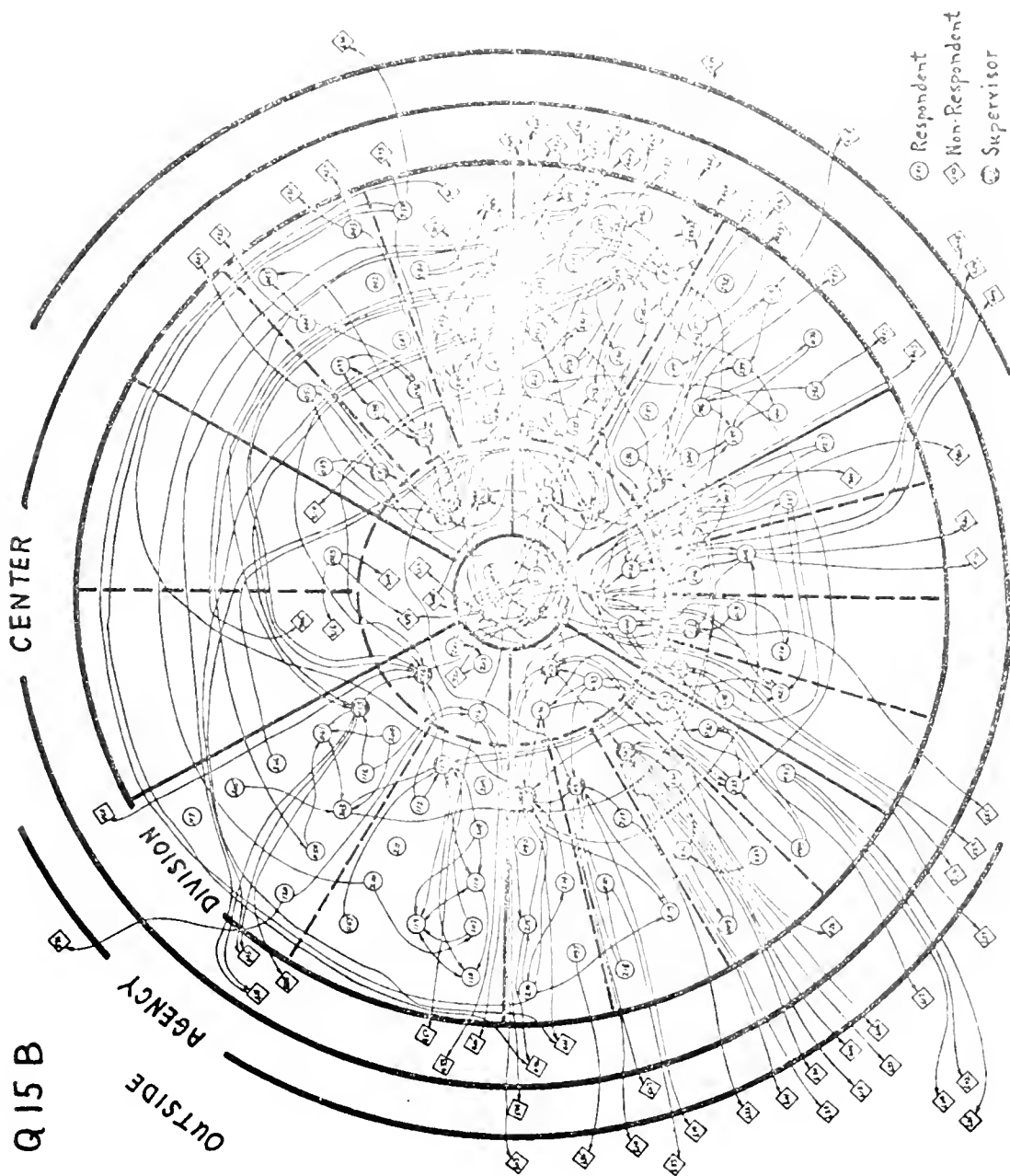


Figure 3. Colleague Choices for Help In Thinking

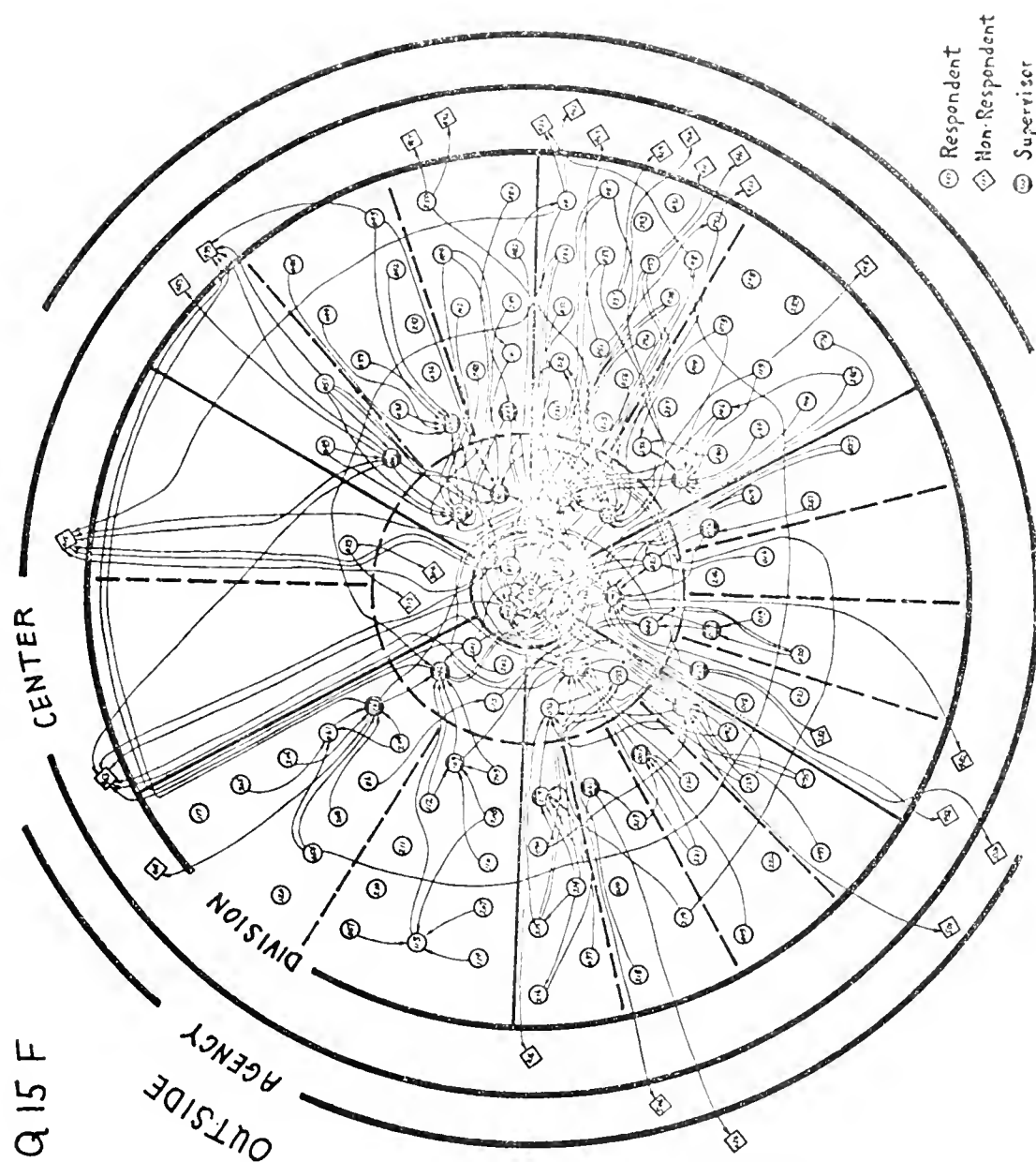


Figure 4. Colleague Choices for Administrative Help.

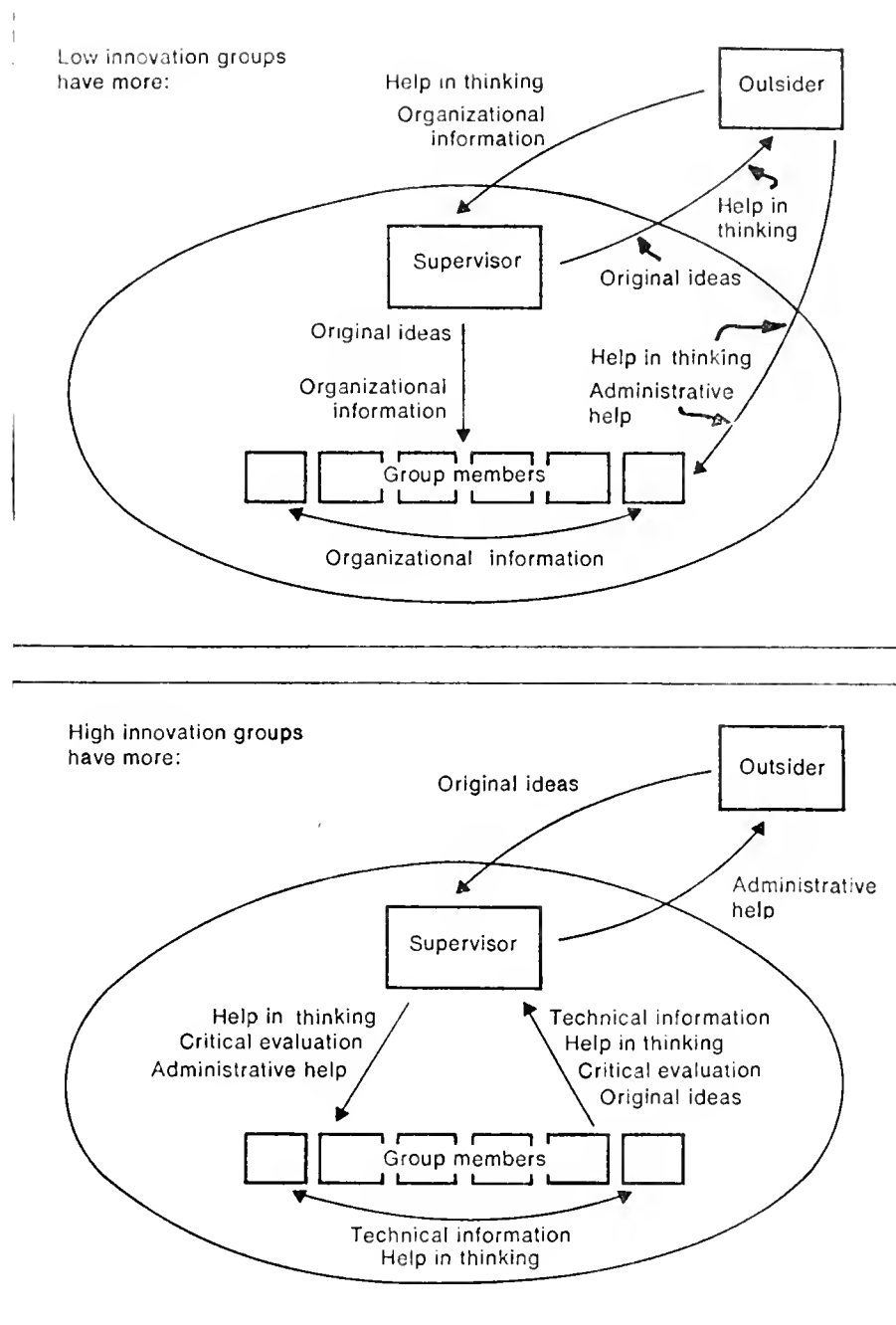


Figure 5. Colleague Roles In More and Less Innovative Groups.

From Farris (1973,p.30)

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